

IN THE CLAIMS

Please amend the claims as follows:

Claims 1-9 (Canceled).

Claim 10 (Currently Amended): A dosing pump for a liquid additive in fuel of a heavy fuel engine, said pump comprising:

a piston;

a cylinder;

an actuator for moving the piston axially in the cylinder, wherein the actuator is a high resolution linear actuator comprising a motor driven by a controller,

a manifold, and

a low friction dish-shaped seal having a peripheral portion forming a seal between the cylinder and the manifold in a fully extended position of the piston, said dish-shaped seal further having a top portion attached to the piston and moving with the piston such that said top portion of the seal is compressed against the manifold in said fully extended position of the piston,

wherein the shape of the seal is configured to minimize non-linearity of the volume dosed as a function of movement of the piston, and

wherein the controller is configured to drive the motor so as to remove a remaining non-linearity of the volume dosed as a function of movement of the piston.

Claim 11 (Previously Presented): The dosing pump according to claim 10, wherein said manifold has at least one inlet and one outlet check valve that are passive, one-way valves.

Claim 12 (Previously Presented): The dosing pump according to claim 10, wherein said pump is a syringe pump of which the piston contacts a solid surface at an end of each dose cycle.

Claim 13 (Previously Presented): The dosing pump according to claim 10, wherein the linear actuator is driven by a rotary electric motor through a gear reduction.

Claim 14 (Previously Presented): The dosing pump according to claim 10, wherein said heavy fuel engine defines a maximum dose of additive for optimal conditions and said pump has a capacity equal to said maximum dose so that a required additive volume is always dispensed through only one cycle of the pump.

Claim 15 (Previously Presented): The dosing pump according to claim 10, wherein said heavy fuel engine defines a maximum dose of additive for optimal conditions and said pump has a capacity lower than said maximum dose so that a required additive volume is dispensed through one or more pump cycles.

Claims 16-17 (Canceled).

Claim 18 (Previously Presented): A fuel system comprising a liquid fuel additive dosing pump according to claim 10.

Claim 19 (New): The dosing pump according to claim 10, wherein the actuator has an accuracy of less than or equal to 0.1 mm.

Claim 20 (New): The dosing pump according to claim 19, wherein the actuator has an accuracy of less than or equal to 50 μm .

Claim 21 (New): The dosing pump according to claim 10, wherein said dish-shaped seal and said manifold are configured so as to create a void between said top portion of the seal and said manifold when said seal moves with said piston away from said fully extended position, and wherein said liquid additive flows into the void created between the manifold and the seal via an inlet valve.

Claim 22 (New): The dosing pump according to claim 21, wherein said liquid additive flows out from said void created between the manifold and the seal via an outlet valve when said seal moves with said piston toward said fully extended position.